"What Scientists and Managers Need From Each Other"

South Florida Restoration Science Forum
May 17 - 19, 1999
Embassy Suites, Boca Raton

Wednesday, May 19

(Edited transcript)

A "roundtable" discussion was held on the interaction between scientists and managers to establish a series of principles and procedures that can be acted upon to enhance and strengthen effective communication and cooperation among scientists and managers engaged in ecosystem restoration in south Florida.

The morning began with a presentation "Balancing Science, Management, and Politics: The not-so-delicate balance of Ecosystem Restoration" from Terrance "Rock" Salt, the executive director of the South Florida Ecosystem Restoration Task Force.

Afterwards the nearly 250 scientists and managers convened in small groups with facilitators to develop recommendations for the representatives on the roundtable discussion.

These activities were lead by Dr. Stuart Langton with Dr. Bonnie Kranzer and Mr. Robert Jones, Esquire. Supported by South Florida Water Management District TeamWorks facilitators Dr. Tim Bechtel, Mr. Julio Fanjul, Ms. Susan Coughanour, Ms. Lynn Masson, Mr. Robert Sosnowski, and Mr. Ed Terczak.

The scientists on the roundtable discussion were:

Dr. Nick Aumen, Research Director
Ecosystem Restoration Department
South Florida Water Management District
[Dr. Aumen is no longer with the district.]

Dr. Brad Brown, Director
SE Fisheries Science Center, National Marine Fisheries Service
National Oceanic Atmospheric Administration
U.S. Department of Commerce

Dr. Sarah Gerould, Director
Place-Based Science Programs
Geological Survey
U.S. Department of the Interior

Mr. Barry Glaz, Research Agronomist
Sugarcane Field Station
Agriculture Research Service
U.S. Department of Agriculture

Mr. Bob Johnson, Research Director
Everglades National Park
National Park Service
U.S. Department of the Interior

Mr. John Ogden, Distinguished Senior Scientist
South Florida Water Management District

The managers on the roundtable discussion were:

Colonel Joe Miller, District Engineer
Jacksonville District
Corps of Engineers
U.S. Army (Civil Works)

Mr. Mike Slayton, Deputy Executive Director
South Florida Water Management District

Mr. Fred Rapach, Policy & Program Coordinator
Water Utilities Department
Palm Beach County

Mr. Dick Ring, Superintendent
Everglades National Park
National Park Service
U.S. Department of the Interior

An edited transcription of the roundtable discussion follows.

[Stu Langton] "The purpose of our panel this morning is to discuss ways in which scientists and managers can communicate and work together as effectively as possible. During the past hour we have been discussing this topic in small groups and a number of recommendations have been developed. My colleague Bob Jones, the Executive Director of the Florida Conflict Resolution Consortium, is collating the recommendations and will present them to us during the panel discussion. By way of preview and example, let me summarize ten ideas that were developed in the group I was in really terrific, and I heard that the other groups were too. I thought I'd give a quick example of the range and quality of ideas just using one group as an example of what happened. In this group, there were 10 suggestions made, and I'll tell you what they are in a couple of minutes."

- "The first is a principle--that the basis of action is sound science as a key management principle--this should always be the driving principle."

- "Second, scientists need to be willing to give their best professional opinion when they can."

- "Third, do not do data dumps, but learn how to synthesize information for managers and the public."

- "Fourth, scientists and managers should jointly set goals and objectives and a vision including financial objectives."

- "Fifth, managers should meet with scientists to understand their tools, modes, and paradigms for their science."

- "Sixth, scientists should meet regularly with policymakers - not just that managers should meet with policymakers. In addition, scientists should meet with the public. This led to discussion that it creates a very different culture for scientists down here. If they're going to engage more with the public and policymakers, they have to work harder at translating their work."

- "Seventh, another high priority item was to provide support and assistance to help scientists apply, synthesize, translate, and communicate their findings."

- "Eighth, managers need to say what they want and scientists need to say what they can and can't do."

- "Ninth, managers need to be accessible and attend meetings with scientists."

- "Tenth, managers need to support scientists and that support needs to be communicated and translated to build a trust between the manager and scientist so the scientist doesn't feel they'll get the rug pulled out from under them."

“We have a panel of scientists and managers, who have been nominated to us by their colleagues for being good at their science or management responsibilities. I'd like to introduce them:

> John Ogden from the South Florida Water Management District,
> Joe Miller is with the U.S. Army Corps of Engineers,
> Dick Ring from Everglades National Park,
> Fred Rapach with Palm Beach County,
> Mike Slayton from the South Florida Water Management District,
> Bob Johnson as a scientist from Everglades National Park,
> Barry Glaz is a scientist with the U.S. Department of Agriculture,
> Sara Gerould from the U.S. Geological Survey,
> Brad Brown from the National Marine Fisheries Service, and
> Nick Aumen from the South Florida Water Management District,
> who is also one of the Co-Chairs of the Science Coordination Team.”

“We're going to ask them some questions. This is a very important exercise for the following reasons. We would like to take these ideas to figure out what has worked, what will work, and what we want to do and turn that over to some people that will work on it. If there is a sustainable culture of cooperation with managers and scientists, then we really have to figure out how to do it. If we talk about best practices, and we expect people to do them in the field of agriculture, why don't we do best practices in terms of how we work together? This is what we're about.”

“To begin this discussion, I would like to ask a question: What are your biggest gripes and your turn-offs in terms of how the other side behaves”?

[Nick Aumen] "I guess one of the things that came out of our discussion groups is to keep each other engaged in the process. Just what's happened in the 2 or 3 days of this forum is a good example. Some of the folks that we've been most trying to engage in this process are those that have been the most inaccessible. The policymakers and the managers that we really want to make the link to are the busiest. They always have a cell phone in their ear or having side meetings, and that's just a fact of life. I think if we can find a process to have that communication in a way that works for them, we might have some improvements."

[John Ogden] "I’ll expand on some of the things that Nick is saying. Certainly one of the experiences that have come out of the Restudy are there are certain kinds of tasks in south Florida related to restoration and resource management. I feel that managers and scientists/policy people need to be on the same level in terms of organization and effort. I think that it substantially improves communication among these people and in certain situations. I don't think we should be viewing this as a dichotomy of manager and scientist. I think they need to become integrated into single efforts so when I run across an old-fashioned idea that scientists are out here as support groups, and they sort of look up to some management policies and responsibilities, I get a little annoyed."

[Stu Langton] "Ok, by the way, we're going to open this up to the audience in a minute so if you have any gripes or annoyances you'll have a chance to share them, or at least some folks will.

[Fred Rapach] "Being a participant in this process in the early 1990's, one of the things that has bothered me is I'd like to hear the total science; those involved in this process and the outcome sometimes in the scientific process may be what they perceive as the desired outcome. I'd like to hear the total package and some of the projects and research going on. It's not unavoidable that someone's interest may cloud the desired outcome. I like to be objective. I like to hear, in the scientific process, you have a problem; you have different hypotheses to work on; you accept the outcome. In this process, sometimes what's desired may actually overshadow the real outcomes."

[Brad Brown] "I think that all too often science becomes the whipping boy for the inability of policy people to make hard decisions. Let me just step outside of ecosystem restoration to use an example from my own field. We rarely ever close fisheries around the world because we never have enough scientific information to show a resource is in trouble. There's a loss of jobs, economic hardship, and most people who watch national television know that world fishery resources are now in a general state of terrible depletion. Yet, even still, we get a resource that isn't all that agreed upon, and we still say there's not enough science to make a decision."

[Sarah Gerould] "I'd like to add to that and kind of give it a cultural spin. I don't know if you can call this a gripe or not, but it certainly has been a consistent theme in my job and I think, throughout what I am seeing here, it seems managers and scientists have very different cultures. The management culture is more 'I want the bottom line and I want it clear and concise so I can make a decision.' The scientist culture combines a great deal of uncertainty. It’s a culture in which the uncertainty must be explored and quantified and in which the description of those uncertainties is every bit as important as the description of the bottom line. I think that it confuses the managers when they hear this uncertainty and they hear there may be a bottom line, but it may also be clouded by issues - these other factors that could pull it either in one direction or the other direction. I guess this is more of an appeal to managers to understand the scientific culture of uncertainty and for scientists to understand that managers have to make a decision."

[Stu Langton] "I just want to add a point, which struck me in working here, and that is the issue of trying to connect the professional cultures and trying to bring integration. I think this is a great opportunity to great lessons learned - some experimentation in building both a culture and a support culture for that kind of thing. An occasion like this sort of triggers it. I think that's one of the exciting things about we all being here."

[Dick Ring] "First, I'd like to say that it is tough to start off with the gripes and the turnoffs when there is so much associated with restoration and the public project we've taken on down here. We have scientists and managers joined at the hip not doing too badly in a whole number of areas. I think I offer my remarks in context of a compliment at how many of the scientists stay at it and are as dedicated to the public purposes that the agencies are focused on as anyone. Scientists deserve high praise in that regard. I would say that two things often times leave me frustrated in the working relationship that we have. One is that science is not an end in itself. In fact, it's not even a *thing*; science can be applied in a number of ways down here. One is the creation of new data, the inventory and monitoring, creation of new knowledge (and that's research), and the solving of problems (and that's the application of knowledge). Whether it is for the public purposes or the problems we're trying to tackle, each requires a legitimate application of the scientific method. Many times scientists are focused on wanting to do research and may look down their noses a bit and see the other activities being not as worthwhile. This extends sometimes to the view that somehow the study of human beings and their behavior and their activities is not necessarily science. It's this thing called social science, and that's something else we haven't gotten around to here in south Florida yet. I think there needs to be an understanding that the application of the scientific method covers the full range of those things, and each is highly honorable. The other piece I want to say is that we're talking about not just science, but the intersection of science and public purpose. There's a lot of science and generation of knowledge that goes on throughout the system here, but we're talking about bringing it into some declared public purpose to solve problems or come up with policies that help accomplish things. There has to be an understanding that the science efforts have to be focused and oriented on those public purposes. It can't be simply the creation of new knowledge that is of great interest but is of little discernable value or association with the purpose or the problems that we're trying to resolve. There are times when it's frustrating to me to find someone who's very, very good in an area and an expert in biology or ecology but he or she is trying to pursue generating new knowledge on things that may become information. The connection to the public mission--the arena that brings scientists and managers together--I don't necessarily understand and how it's tied to the objectives often times isn't given a lot of thought."

[Stu Langton] "I am hearing some of the very thoughtful comments, and somebody asked me will there be any record of this? I believe the Corps is taping it, Tim Bechtel is with South Florida Water Management and taking notes as well."

[Fred Rapach] "This may be breaking out of the agenda, but I heard a term yesterday that I need to have somebody explain to me. The term is the 'Politics of Science.' Could somebody explain to me the term and I'm getting different thoughts in trying to interpret that statement; maybe I need someone else to tell me what the 'Politics of Science' are."

[Stuart Langton] "I think there might be several cuts at this, but one is certainly the competition within the disciplines and how people position themselves and are so critical of those who disagree with them or have different points of view. As we used to say in the academy, *the politics are so vicious because the stakes are so low . . . dogs fighting over a bone*. I think there is a lot of that in science, and I think that at a more macro level here is certainly a 'Politics of Science' which we're discussing when policymakers want to have you cook science for them or the different sponsors with their dueling Ph.Ds. There is an awful lot of it, which we've seen here and all over the country."

[Nick Aumen] "I didn't come up with that phrase, but it's an interest to me. I would say that within the scientific community, whether you work for an agency, government, or an academic institution, they're all the same issues facing you as a professional. Competing for funding, competing for priority, egos (not that we have any of those here in south Florida), and all of those things that apply to scientists aren't special in that regard. Looking at the scientific community, they face the same problems that everyone does."

[Mike Slayton] "I have a comment on what someone just said. Infighting as far as something that puts you off - this technical infighting and worse are the technical grandstanding and the media (not Cy) [staff writer Cyril Zaneski of the Miami Herald who was in the audience] rising to fill up space with technical grandstanding."

[Stu Langton] "Anybody in the audience want to make a comment about this issue at this point, any particular gripes?

"I'm Joan Browder, and I'd just like to point out that this whole activity at the South Florida Restoration Science is supposed to be science based. When you look at the funding for science within all these activities, you see that funding for science is quite low compared to the overall funding and it gets cut every year from what is asked for and it gets cut at several levels. There is never enough to do what scientists say needs to be done to address the questions."

[Joe Miller] "Which brings up a fundamental problem; that is, making sure we've got the science at the right time and answers as we progress with the restoration effort. Have we identified what we need for 2020 in terms of science? Are we working toward that end and when we get there will we have a product that allows policymakers to make an appropriate decision because we developed the science or the information necessary."

[Stu Langton] "As we think about these challenges, we have come up with a number of ideas in our groups that are responding to these needs. Bob Jones has been kind enough to take from each of the groups the top comments they had, and in a minute we want to take a look at those; we've started to put them up here. I just want to alert the panelists that we are going to want some feedback about these issues, but we have an audience comment."

"I'm Seymour Holtzman. I've sat on both sides of the issue both as a scientist and a manager. Some of these things covered here from both sides of the issue, for instance, the manager who defines a project for the scientist and has made the wrong choice and it gets laid off on the scientist. By the same token, you have the scientist that is willing to take that money either for his [or her] own ends or not to help clarify things for the manager. Thank you."

"I am Billy Causey with the Florida Keys National Marine Sanctuary. I want to echo something Nick said and I brought up in our session, but I want to share it with everybody. At the Florida Bay Science Forum last year, there were hardly any managers present and it was one of the best forums yet. It was scientists talking to scientists. One of my concerns is that the managers (and I am going to ding the managers and I am one) don't take the time and the effort to go to the forums, and it's good to see the managers at this one, but that is the responsibility of the managers. Managers also very often try to blame the scientists for not being good at articulating science for the lay public. Scientists don't do that; it's not what they are trained to do. Managers are the ones that manage various programs within their various entities. They are the ones who have the education, outreach programs, public affairs programs, and the liaisons to the politicians. I think there needs to be less finger pointing and more responsibility on the part of each side to do their jobs as either scientists or managers."

[Stu Langton] "This reinforces what Rock Salt said this morning [in his opening remarks] about leadership and what the attitudes of leaders demonstrate."

[John Ogden] "Could I disagree quickly about one thing? I agree with everything that everyone says, but I disagree with one thing Billy just said. I think scientists do have a responsibility to synthesize and translate their messages to managers and the public. There's a role within science that only the scientists understand, and it is their responsibility to translate that information."

[Billy Causey] "John, I agree with you. I didn't mean to draw such a rigid line because I agree there is a responsibility on both parts, but we tend to shift to the scientist. There needs to be more communication by both is my point."

[Brad Brown] "I would just like to open the door up to some general comments. We use the term *manager* as if that's a monolith, and in reality, I think *manager* covers a wide variety of things. I mean, Billy is a manger and his responsibility is to manage an area, the National Marine Sanctuary, and there are certain decisions he has to make. I deal with public rules and regulations for when fishing season is closed. There's a management decision that's going to be made right now in Congress regarding whether or not we adopt the Restudy, and do we move ahead with that area? This requires science input too. In fact, there was a lot of science input that went into the acceptance of going forward with this restoration process in the beginning. There's policy people, legislators, and on the ground managers, and science has to learn how to communicate at all of these levels because it's a different type of communication depending on the need of the manager involved."

[Nick Aumen] "I agree with an earlier comment that maybe we shouldn't try too much to force a dichotomy here because both scientists and managers are being forced to be involved in all the decision making that's going on here in south Florida. Scientists can no longer afford to produce the information and step away from it saying my job is done. They have to be there to make sure science is used appropriately. I think scientists can be asked to be better communicators. We're not trained. I think most of us from the university side end up teaching classes, and you have not had the first class in education on how to teach effectively. Some learn and some don't, so we should look for both managers and scientists; the best people in both areas should be the communicators. I don't think every scientist should be expected to spend 50 percent of their time communicating or engaged in the decision-making process. Those that are the best ones to do it and make the most sense should do it. This forum is the perfect example. When we got scientists (and it was the first time for some of them), lay language was very difficult, with some saying: 'How am I going to do this'? You still got several iterations on some of these posters. There's a learning process, but one that can be successful and I think the same thing is true for managers. There are certainly some managers that you wouldn't want to be outreach folks; you'd be in trouble. The call to all of us is to become better communicators and utilize those people that are most effective at these skills"

[Fred Rapach] "Nick, to follow that point, I looked in as many rooms as I could and maybe there's an issue there of the scientists actually communicating with each other. By talking with some of the people, you get a sense that they are doing such independent work. Are they actually coordinating their efforts together? A smaller scale compared to our larger concerns that I have is that who's actually facilitating all of the efforts going on in south Florida? Who could be a representative body that could bring all of this together. I think that was part of the GAO [U.S. General Accounting Office] reports. I am seeing some of the research and some of the science, but I don't think there's much effective communication within the science community."

[Nick Aumen] "I think that's a real good point. There is a body now to do that, and that's what the outcome of these sessions and this forum is destined for which is the Science Coordination Team. Ronny Best and I co-chair that team. My observation is similar to yours. I have been here for 8 years, and the difference between 5 years ago and now is light years in terms of communication and coordination, but to where we need to be, we're probably still light years away and I think this is one of the steps to get there. I think that Rock [Salt] talked about it this morning - the need for an interagency south Florida science plan that would help build on the strengths of individual entities and get them working together so there's not duplications. People are taking steps toward it but we have a long way to go."

[Barry Glaz] "One comment to this and I don't want to make it sound like it's black and white, and there's no correct answer. A lot of scientists are not good communicators. Although you could say being a good scientist involves communication, we have a lot of people doing a lot of good work that's not getting communicated properly, and I see a real need to get some professional communicators. Information people are needed to help synthesize information and take care of this need for communication from scientist to scientist, scientist to manager, and scientist to public."

[Stu Langton] "Great suggestion. Bob, could you tell us what the highlights were of those groups"?

[Bob Jones] "Let me say to the panel I have given them a few pages, and we'll get some for the audience; its going through the Xerox. What we did is from the six groups we culled the number one issue and made a second sheet with the second level of issues. Just as a real brief summary, I think everything on that page has to do with a lot of ways to more effectively communicate between and among scientists, managers, and the public. You'll see as you go down that list, woven in there, are some particular ways to focus that communication on this page, and on the next page there are several more that focus on this activity of that synthesis with some suggestions. There's a specific example on how to go about doing it and funding the effort. This relates to the discussion we just had about whether you can rely on scientists to do that job on their own in the context of what you heard yesterday on the 100 to 150 percent of the time they are spending on projects. There are communication gatherings, such as the annual planning gathering on this page. The second list is related to the synthesis one and also to communication, so there's a real strong thread here about what may be needed and how to go about doing it. In the one about the synthesis, there was one idea about funding information specialists with new funds. (That is, don't deduct from what's being funded now.) You have to work with scientists in synthesizing the information you have that can then benefit both the scientific enterprises, management enterprise, and greater public awareness of these things so the synthesis was a broad multifaceted thing. The rest here are some practical suggestions about standards and protocols that might be developed and put into place and some reminders about what managers should remember about. Science provides answers in a certain format, and you need to take that into account when you integrate it into your management decisions and your management planning. I think communication runs through all of them in different ways, producing effective communication in science and management."

[Stu Langton] "Thanks Bob for an excellent summary and also for putting it together."

"I am Ron Smola with the USDA [U.S. Department of Agriculture]. Obviously communication outreach is one of the things we have grappled with for a long time. Being a member of a group since 1993, the continued frustration we have both from the management side and scientific side is that we all recognize the communication not only among ourselves, scientists, and managers, but to the public, press, and young people we don't dedicate our resources. We know it needs to be done if restoration is going to be successful. We need to get the public behind it. We need to provide that communication education; we don't spend enough time and staff doing it, and I am not sure what we do but most of the members of the panel are in the working group or member agencies, and I just challenge you to do a better job."

"I am Ronnie Best, Co-Chair of the Science Coordination Team. All the comments, the synthesis need, etc., have been clearly identified, and there's a lot of information we need to synthesize. There is something that Colonel Miller said a few moments ago, and that is we're looking to the year 2020 at least. We need to have managers and scientists that are visionaries and say: *What set of questions do I need to address to 2005, 2010*? We need to start making sure the information we are collecting now and the synthesis we are doing guides us in that direction. If we are not visionaries and we simply synthesize what we know today, we'll be lacking in what we need to know tomorrow. We need to be looking to tomorrow in all of our discussions between scientists and managers."

[Brad Brown] "I'd like to say something on this issue of communication. Certainly we all agree with its importance, but to me the communication with the public and the communication between the scientists and managers are really two different things. There may be some scientist that may be very good at communicating with the public, but if they spend a lot of time on it, they're not going to do their job and probably they are better off having specialists translating. With managers, you cannot have someone in between. There has to be direct lines between the scientist and manager because there are too many uncertainties that have to be developed and that involves a dialogue between the scientists and those who have to make decisions - *Do I do this now and apply it?* I think to reiterate what Nick was saying, the scientist must have a dialogue with managers; it can't be handed off to a specialist when you're dealing with the general public. This is the area in which the specialists do a really good job."

[Fred Rapach] "I think this leads into the process I had before this panel convened. I asked some of my colleagues if the Restudy is such a good thing. Why is it so hard to sell? Some of the responses back were cost. As a manager, cost is something I can handle. Cost and funding is always an issue and I can work it out. Size of the project is another matter of concern by maybe some people. Size is something I can still relate to, but then someone mentioned uncertainty and there's a red flag. Their interpretation of uncertainty is that we've conducted research and we'll continue to research, but we'll progress forward. To me, uncertainty is a red flag. I cannot make a decision on uncertainty; in my mind set, there's the disconnection. The interpretation of uncertainty to a scientist can be dealt with because that's the process they work out. For the managers, it's a decision they will not proceed forward. There's a process we need to work on: How do we resolve that interpretation of uncertainty "?

[Dick Ring] "The issue of uncertainty is one that needs to be explored further, but I'd like to go back to the one on communication. Scientists and managers definitely bring different expectations to the table when they communicate. They also bring different demands on the rest of their lives, and neither one of them wants to spend an extraordinary amount of time doing what is not principally what they do. How many times have folks sat in a meeting as scientists, listening to managers drone on about the political and the financial consideration issues and the resources associated with trying to take knowledge and apply it, with their eyes rolling in the back of their heads? The scientists are thinking*: I wish I were out in the marsh collecting samples.* How many times have managers sat in a room wanting to know the results and the reasoning behind the results, while being told every arcane detail of the methodology and the techniques of the data collection, having their eyes roll to the back of their head and wishing they were out trying to connect with somebody in the Governor's office about legislation that's going to affect their agency's mission the next day? I think we need to have forums that make more timely use and better focus on what we can bring to the table; I don't think we do that well with it. I think we waste our time sometimes trying to communicate, and I think we need to find better ways to make that happen."

[Barry Glaz] "I just wanted to respond to Brad because number one, I agree totally with him that scientists and their managers should be communicating directly, but when I brought up that we need professional communicators between scientists and managers, I had in mind that this is a multidisciplinary and multiagency participation. For instance the science I do may need to be communicated to Brad's managers. Even with Ron Smola (and we're in the same department but different agencies), my science would need to get communicated to his managers, and I don't have the time or capability to do it. We need professionals to communicate the science to the manager."

[Nick Aumen] "Let's get back to Fred's comment on uncertainty. It's a tough one because at the most fundamental scientific level, you're never going to have 100 percent certainty and that's something we need to address. I view scientists' role in south Florida, anywhere in this kind of work, is to increase the certainty with which you make management decisions. What we need to agree on is what level of certainty are you willing to make that decision because the time and cost involved in increasing the level of understanding beyond a certain point may not be worth it. In other words, we can get you to a certain point in a level of understanding at which you need to move forward. I frequently use a medical analogy: *If you think your physicians are treating you with 100 percent certainty, you're in trouble because they're not able to do that.* Medical research does the same thing that we should be doing for ecosystem restoration and science -- increasing the certainty. We need to do research to increase our level of knowledge, but still make decisions. I think that's a public participation issue to their level of coming to grips with acceptable risk and sometimes marginal levels of certainty."

[Sarah Gerould] "I'd like a show of hands of how many people are mangers and how many are scientists? I would count people who are managers of scientists as scientists. How many people are managers? The rest are scientists? The reason I am asking this is because of something Dick said and that is the issue of trying to make sure that what we do as scientists is effective. I think the scientists know and I think the managers also appreciate that this forum was a tremendous amount of effort. As Nick said, it involved a lot of iterations to try to get these things into a format that is very usable for managers. It's important to realize that a tremendous effort has been put into this from the scientists' perspective. It's very valuable from the scientist perspective to understand that a similar amount of effort has been put in by the managers to try to understand the information. Managers, you should go to all of the rooms upstairs, avail yourself of this opportunity to hear what the scientists have to say, and not schedule side meetings. People have made a tremendous effort to put this forum together for managers. I think this forum is unprecedented from my perspective in terms of tailoring the scientific information for management needs. It's good to know that managers are here and it would be better if more were here. We have to make sure we do things in a very effective way."

[John Ogden] "I'm still hearing a lot of people talking about scientist and manager in a stereotype way, and the point was made earlier that there are all kinds of managers and all kinds of scientists. One of the lessons of the Restudy is that there are managers who have real talents, who have good communication with scientists and real knowledge and skills for communication to be very successful with scientists. There are scientists that have these same skills who really know how to communicate with managers, and understand the manager's point of view. With that recognition in the Restudy process, we gradually created teams or the teams evolved in ways that dichotomy between managers and scientists just disappeared. In terms of the way we operated, boundaries essentially disappeared. Those teams were extremely successful, and some of the thinking we've been doing lately is that there are scientists, maybe a new breed of scientist -- a special subset of scientist, who have these talents. The agencies need to recognize the magnitude of what we're trying to do. We're trying to do fulltime jobs. Certain scientists need to spend their entire careers working on this synthesis/translation and working with policy people on kinds of tasks."

[Mike Slayton] "Speak to us collectively as scientist and manager. When it comes down to it, all of us are not *that* bright. We don't understand how the system works, we know we need to make changes to it, and we've committed a tremendous amount of resources with the Corps in developing a Restudy plan. I hope we don't build it all because I hope 15 years from now we're a little brighter than today, we know how to do things better, and we are more reflective of societies' values. Scientists and managers are working toward responding to what societies' values are, and communication is a good and very important part. I also agree with the point that we shouldn't put our scientists on the front line."

[Stu Langton] "We've got about 5 more minutes, and I am going to ask for a 30-second closing for each of you. Look at the list and think of one good idea that you think is strategically so smart you would want to stand up for it. Or, if you had a bit of advice for the Science Coordination Team for how they can keep working on these types of issues, indicate any strategy or approach."

[Fred Rapach] "I just have an idea. This whole list I think we're missing. We're looking through the forest and can't see the trees. People started to touch on this. The people that are involved in this process, myself and others, have developed this relationship. I think we're the ones that are going to make this happen, and I think we're forgetting that the interrelationship between the scientists and managers is the most important component of how we're going to do this. Every year goes by, I get to know more and more people involved in this process, and we're going to do it. I think that's what we're missing. We're the ones that are going to make this thing go. We can't say the scientists are going to do it or the managers are going to do it. We have to look at ourselves. Each of us has the relationships we're building to make it happen."

[Barry Glaz] "I want to follow up positively on something Brad said about managers making scientists the whipping boys when things don't work out right, and I think that's exactly what's happening here. The task force has made the Science Coordination Team the whipping boys for why the communication isn't happening. What really is going wrong with the process is that the PCT [Project Coordination Team] approach isn't working. I would say that the task force either dissolve the PCT or provide support to get the PCT's to work."

[Bob Johnson] "I want to follow up on the issue of dealing with centralizing management needs. I will go further by saying the decisions are "required actions" and by stressing that the schedule / sequence needs to be followed whether or not you're in agreement with the Restudy findings. The Restudy sequence shows when you have to make decisions as it moves forward. That's missing in so many of our work processes. If we know more about the actions that managers have to take and when the actions have to be taken, the scientists do science which better meets those needs. This tailoring is really critical when there are so many interdependent projects going on; otherwise, the science needs become overwhelming which is currently happening."

[Nick Aumen] "The message to me is to take time to communicate and do the old grass roots organizing. How do you do grass roots organizing? Well, you talk to one person and then talk to another person. Think about it here in the science-management dichotomy, making the time to communicate has to be part of our profession. If you think this forum that happened over the past few days was our day job for 95 percent of the people that did it, it wasn't. It was a lot of late night work and weekends. Just talk to Bob Mooney who has accumulated 12 hours sleep over the past three days. It always seems like additional things need to be included. There were no projects put on hold while we put this forum together, but to better communicate even into our daily operation better than we're doing now."

[John Odgen] "I have a specific recommendation that I'm going to address it to scientists, but it applies both ways. If you're a scientist, you need to take your favorite or maybe your least favorite manager out for a beer some night."

[Dick Ring] "A specific compliment and suggestion is that this type of forum has never been done down here before on this scale I think it has been an outstanding effort. I am amazed and excited about not only the information being boiled down into the posters, but the posters are now going to be on the Internet and be continuously available and kept current. I think that's extraordinary. I think the folks who put it together should be complimented. We should keep it going if not every year then every other year because we need this. The other thing is a bit of thought for the scientists from a manager, and that is two things: Don't accept being pushed into providing the answer if you don't have it, and the other is don't get rolled if you do have it."

[Brad Brown] "I'll enjoy having a beer with my favorite manager, however I am not sure *in vino veritas* always works. I think we do need to emphasize that managers really do need to work at understanding what science can give them. Scientists need to work harder at putting the information to managers in a way that enables managers to use that science to make a decision recognizing that there are many other factors. Getting back to the uncertainty principle, you're not going to ever decrease totally. It's how far do we need to decrease it. We need to be able to express uncertainty in terms of how far we've already decreased it so that managers can factor that in when making their decisions."

[Joe Miller] "We have a unique challenge as members of this restoration effort. What I ask is that we all look to the future to the Year 2020 and focus on where we want this effort to be. We should all take time to asses what we're working on today and will that contribute to the collective vision of a restored Everglades in a sustainable south Florida. Take time to asses whether each of our efforts are focused toward that goal, and if that is not so, we need to take the time to focus ourselves."

[Sarah Gerould] "I'd like to kind of draw on what Joe [Miller] and Ronnie [Best] have said. Think about the future. Look to the future and where we want to be. There are a bunch of different aspects. The bottom line: What do we want this ecosystem to look like? How do we want to communicate? How do we want science to be conducted? All of these things involve a kind of vision for where and how and what and why we are here."

[Mike Slayton] "If you look at science as the search for the truth and you recognize that politics isn't, you need to know that difference and try to get the information elevated so it can participate in the political process more."

[Stu Langton] "I want to thank everyone on the panel; they're an excellent panel with terrific ideas. Communications was mentioned by so many of you. One of the nice things about working, is that you build colleague relationship with people and you learn how to get things done together. I want to say personally how great it has been to work with Aaron Higer in particular on this venture. He had the vision. And with Bob Mooney who put tremendous work into it. In fact, at the beginning (based on my involvement in conferences like this), I said I don't know if we can do this guys. They said 'we can do it.' They did it. It's just remarkable and I want to congratulate them."

Applause…

[end of roundtable discussion]